

What is Claimed is:

1. A steering control apparatus comprising:

a handle angle detection part for detecting a rotation angle of a handle mounted in a vehicle and sending a handle angle signal;

a road surface reaction force torque detection part for detecting a road surface reaction force torque from a front wheel of the vehicle and sending a road surface reaction force torque signal;

a lag arithmetic part including a first order lag filter to which the road surface reaction force torque signal is inputted and which has a previously determined specified time constant, for calculating a steering reaction force torque by using output of the first order lag filter;

a first motor fixed to the handle and for generating the steering reaction force torque on the handle;

a first control part for controlling the first motor on the basis of the steering reaction force torque;

a lead arithmetic part including a first order lead filter to which the handle angle signal is inputted and which has a same time constant as the specified time constant, for calculating a steering angle signal of the front wheel by using output of the first order lead filter;

a second motor fixed to the front wheel and for controlling the front wheel angle; and

a second control part for controlling the second motor on the basis of the steering angle signal.

2. A steering control apparatus comprising:

a handle angle detection part for detecting a rotation angle of a handle mounted in a vehicle and sending a handle angle signal;

a road surface reaction force torque detection part for detecting a road surface reaction force torque from a front wheel of the vehicle and sending a road surface reaction force torque signal;

an arithmetic part for calculating a steering reaction force torque by using a previously determined specified constant on the basis of the road surface reaction force torque;

a first motor fixed to the handle and for generating the steering reaction force torque on the handle;

a first control part for controlling the first motor on the basis of the steering reaction force torque;

a correction arithmetic part including a differential circuit to which the road surface reaction torque signal is inputted and which has a previously determined differential time constant, for calculating a correction signal by using output of the differential

circuit;

a lead differential correction arithmetic part for inputting the handle angle signal to a first order lead filter having a same time constant as the differential time constant, and adding the correction signal to an output signal of the first order lead filter to calculate a steering angle signal of the front wheel;

a second motor fixed to the front wheel and for controlling the front wheel angle; and

a second control part for controlling the second motor on the basis of the steering angle signal.

3. A steering control apparatus according to claim 1, which comprises time constant setting means for changing the time constant of the first order lead filter.

4. A steering control apparatus according to claim 2, which comprises time constant setting means for changing one of or both of the time constant of the first order lead filter and the differential time constant.

5. A steering control apparatus according to claim 3, wherein the time constant setting means changes the time constant in accordance with detection output of a driver state detection device for detecting a state of a driver of the vehicle.

6. A steering control apparatus according to claim 4, wherein the time constant setting means changes the

time constant in accordance with detection output of a driver state detection device for detecting a state of a driver of the vehicle.

7. A steering control apparatus according to claim 2, which comprises correction signal adjustment means for adjusting a differential value of the road surface reaction force torque and a magnitude of the correction signal proportional to the time constant of the first order lead filter.

8. A steering control apparatus according to claim 1, wherein the handle and the front wheel are mechanically coupled with each other.

9. A steering control apparatus according to claim 2, wherein the handle and the front wheel are mechanically coupled with each other.

10. A steering control apparatus according to claim 1, wherein the specified time constant is set to be 0.3 sec or more and 0.7 sec or less.

11. A steering control apparatus according to claim 2, wherein the specified time constant is set to be 0.3 sec or more and 0.7 sec or less.